

Progress in the Control of Childhood Obesity

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Two recent reports from the Centers for Disease Control and Prevention and reports from a number of states and municipalities suggest that we are making progress in the control of the obesity epidemic, particularly with respect to younger children. The 2 national surveys that have provided the most valid and reliable data are the National Health and Nutrition Examination Survey (NHANES) and the Pediatric Nutrition Surveillance System (PedNSS).

NHANES has been conducted annually since 1999, and when data from each 2-year cycle are combined, NHANES provides a representative sample of the US population. A total sample of >3300 2- to 19-year-old children and adolescents were included in NHANES in 2011–2012; 871 of these children were 2 to 5 years old. The most recent NHANES report¹ described a statistically significant absolute decrease of 5.5% in the prevalence of obesity among 2- to 5-year-olds between 2003–2004 and 2011–2012.

Inspection of prevalence rates over time show that after a consistent increase which began after 1980, the prevalence of obesity in 2- to 5-year-old children began to plateau between 2003 and 2004 (Fig 1). Data between 2003–2004 and 2009–2010 showed no statistically significant change in childhood obesity rates, whereas a decrease of 3.7% occurred between 2009–2010 and 2011–2012 in 2- to 5-year old children. No significant changes were observed in the prevalence of obesity among children and adolescents in other age groups. Because of the small sample size, trends in ethnic groups other than non-Hispanic white subjects could not be reliably assessed. Furthermore, due to the relatively small sample size at each measurement point, substantial variability can be expected, but the most recent findings exceeded predicted variability.

The prevalence changes in young children in NHANES are supported by the decreases in prevalence that have been reported in a number of states and communities in PedNSS, an annual state-based survey of 2- to 4-year-old, low-income children, most of whom were enrolled in the Supplemental Nutrition Program for Women, Infants, and Children. In 2008 and 2011, PedNSS measured heights and weights from >2.7 million children from 40 states; Washington, DC; and 2 territories. Statistically significant decreases in the absolute prevalence of obesity that averaged 0.7% (range: 0.3%–1.6%) were observed in 18 states (Fig 1).² By itself, the most recent decline observed in NHANES could be considered an aberration were it not accompanied by a previous decline between 2008

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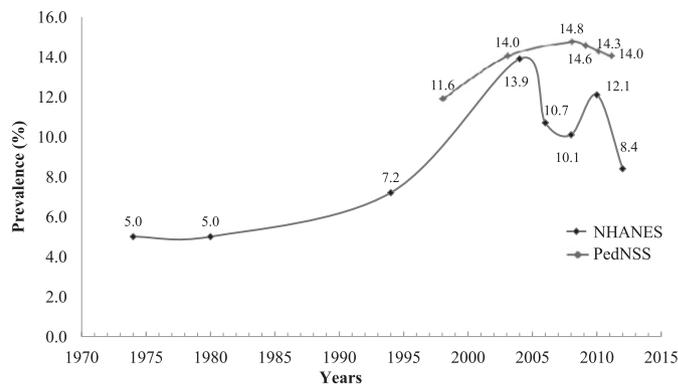


FIGURE 1

Childhood Obesity Trends Over Time in 2-5 Year-Old U.S. Children. Prevalence of obesity, defined as a BMI \geq 95th percentile in 2- to 5-year-olds children included in NHANES, and in 2- to 4-year-olds included in PedNSS. The PedNSS data were drawn from data reported in *MMWR 2009;58:76*, and represent the annual average prevalence among children in the following states: California, Florida, Georgia, Idaho, Iowa, Kansas, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New Mexico, New York, South Dakota, and Washington. Mississippi did not report data for 2003 and therefore was not included in that year's calculation.

and 2009 and the decline in prevalence observed in PedNSS between 2008 and 2011.

In addition to the changes observed in PedNSS, 6 states and 14 communities have also reported decreases in the prevalence of childhood obesity (Fig 2). In general,

the magnitude of the declines was similar to that observed in PedNSS. However, in contrast to the NHANES and PedNSS data, the age ranges and sample sizes of the youth included in these surveys were highly variable. Furthermore, the precision of the measurements and exclusion criteria

on which these reports were based were not always specified. In some of the municipalities in which declines in prevalence have been observed, greater declines have occurred in the white population, which widens the disparities between white subjects and other ethnic groups. Nonetheless, these observations also suggest that progress is being made in reducing childhood obesity.

Although the precise mechanisms that account for the aforementioned decreases in prevalence remain uncertain, a number of national trends and local initiatives have accompanied the decreases. The impact of these trends and initiatives on the declines in obesity prevalence among different age groups may be best understood in the context of the caloric gap. In 2012, Wang et al³ suggested that the daily caloric deficit necessary to return the mean BMI to the levels last seen in the 1970s was ~30 kcal in 2- to 5-year-olds, 150 kcal in 6- to 11-year-olds, and 180 kcal in

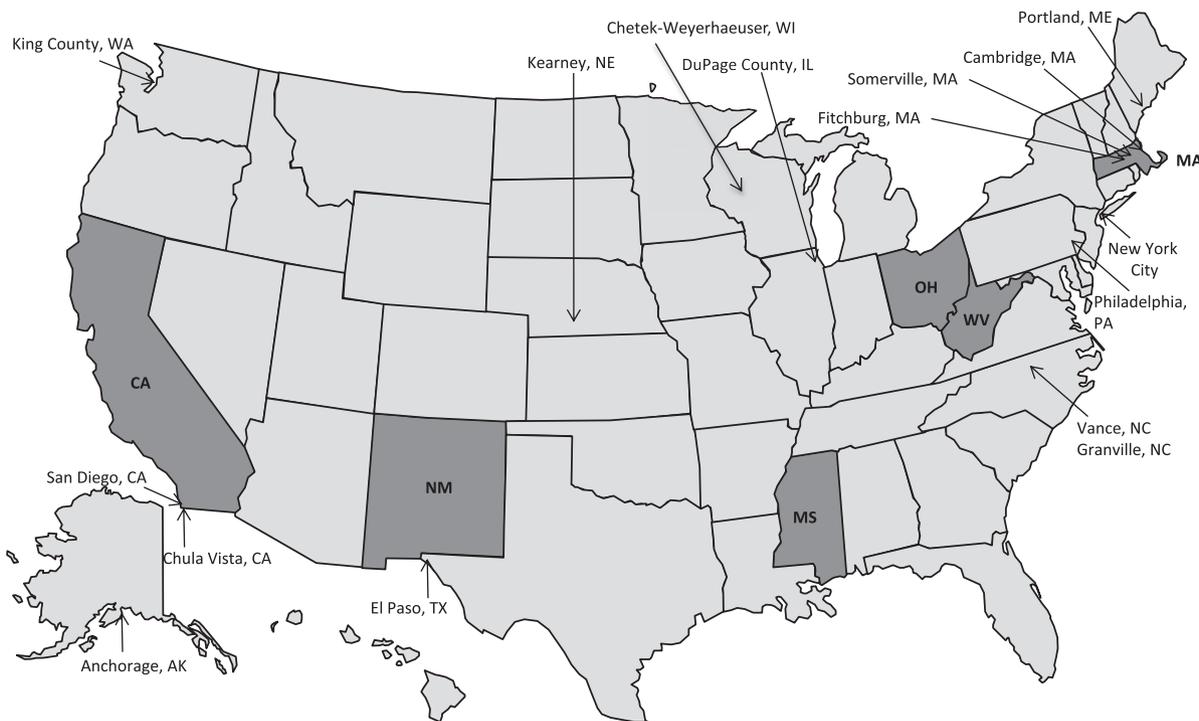


FIGURE 2

States (in gray) and municipalities that have reported decreases in the prevalence of childhood obesity. In contrast to the NHANES and PedNSS data shown in Fig 1, the ages of the subjects of these reports are variable, but the observed decreases support the findings in younger children.

12- to 19-year-olds. Between 1999–2000 and 2009–2010, the daily intake of sugar drinks declined by 68 kcal in 2- to 5-year-olds, 71 kcal in 6- to 11-year-olds, and 84 kcal in 12- to 19-year-olds.⁴ Between 2003–2004 and 2007–2008, the caloric intake of fast food from restaurants decreased by 64 kcal among 2- to 11-year-olds and 14 kcal among 12- to 19-year-olds. Because individuals do not adjust their caloric intake to compensate for the intake of either sugar drinks or fast food (ie, consumption of these products results in excess caloric consumption compared with days when these beverages and foods are not consumed⁵), the reported declines in calories from sugar drinks and fast foods may be true decreases in caloric consumption that are not otherwise compensated.

Two additional initiatives may have also contributed to the observed decreases in early childhood obesity. Since 2009, the Supplemental Nutrition Program for Women, Infants, and Children food package has included fruits and vegetables, increases in whole grains, and 2% milk. Although none of these changes alone could be expected to decrease obesity, increased fruit and vegetable consumption might be expected to displace more calorically dense foods. Second, the Healthy Weight Commitment Foundation announced

that the companies which supply 36% of the calories sold in the United States had reduced the calories that they produce by 6.4 trillion calories in the US food supply or almost 80 kcal per person per day.⁶

Taken together, these changes could be expected to have an impact on rates of obesity. If the decreases in caloric intake were distributed equally across age groups, greater declines in the prevalence of childhood obesity could be expected in younger children, as observed in both the NHANES and PedNSS data, because, as indicated here, the caloric gap necessary to return the mean BMI of 2- to 5-year-olds to that of the 1970s by 2020 is 30 kcal/d.³ If current trends in decreased fast food and sugar drink consumption continue, and as the current cohort of 2- to 5-year-old children ages, we might anticipate further declines in the prevalence of childhood obesity. However, the greater declines observed in white children compared with other ethnic groups emphasize that intensified efforts to identify and implement effective strategies to address ethnic disparities are essential.

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REFERENCES

1. Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of childhood and adult obesity in the United States, 2011–2012. *JAMA*. 2014;311(8):806–814
2. Centers for Disease Control and Prevention. Vital signs: obesity among low-income, preschool-aged children—United States, 2008–2011. *MMWR Morb Mortal Wkly Rep*. 2013;62(31):629–634
3. Wang YC, Orleans CT, Gortmaker SL. Reaching the healthy people goals for reducing childhood obesity: closing the energy gap. *Am J Prev Med*. 2012;42(5):437–444
4. Kit BK, Fakhouri TH, Park S, Nielsen SJ, Ogden CL. Trends in sugar-sweetened beverage consumption among youth and adults in the United States: 1999–2010. *Am J Clin Nutr*. 2013;98(1):180–188
5. Powell LM, Nguyen BT. Fast-food and full-service restaurant consumption among children and adolescents: effect on energy, beverage, and nutrient intake. *JAMA Pediatr*. 2013;167(1):14–20
6. Robert Wood Johnson Foundation. *Major Food, Beverage Companies Remove 6.4 Trillion Calories from U.S. Marketplace*. Princeton, NJ: Robert Wood Johnson Foundation; 2014

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